



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/067,024

02/04/2002

Gene E. Lightner

4244

7590

03/25/2004

Gene E. Lightner

706 SW 296th St.

Federal Way, WA 98023

EXAMINER

MEDINA SANABRIA, MARIBEL

ART UNIT

PAPER NUMBER

1754

DATE MAILED: 03/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/067,024

Applicant(s)

LIGHTNER, GENE E.

Examiner

Maribel Medina

Art Unit

1754

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 February 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 3/19/02.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) filed on 3/19/02 has been considered by the examiner.

Specification

2. The disclosure is objected to because of the following informalities:
 - a. In page 4, 2nd paragraph, lines 4 and 5-6 the term "carbon monoxide" should be changed to --carbon dioxide--. Note that stream **18** contains hydrogen and carbon dioxide.
 - b. In page 6, 3rd paragraph, line 3 "**34A**" should be changed to --**38A**--, see figure 3.
 - c. Appropriate correction is required.

Claim Objections

3. Claims 1 and 2 are objected to because of the following informalities:
 - a. In claim 1, line 5, the limitation that reads "providing said gas containing organic vapors" should be changed to --providing said gas containing water vapor and organic vapors--. This change will clarify that the gas provided also contains water vapor as cited in the preamble of the claim.
 - b. In claim 1, line 14, the limitation that reads "from the gas containing hydrogen," should be changed to --from the gas containing hydrogen and carbon dioxide,-- This change will clarify that the gas provided also contains carbon dioxide or as cited in the previous step.

Art Unit: 1754

- c. In claim 2 line 1, the limitation that reads "containing organic vapors" should be changed to --containing water vapor and organic vapors--. This change will clarify that the gas provided also contains water vapor as cited in the preamble of claim 1.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

5. Claims 6-15 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- a. Claim 6 recites the limitation "the carbonaceous residue". There is insufficient antecedent basis for this limitation in claim 6 or 2, however, the limitation will have proper antecedent basis if the dependency of the claim is changed to claim 5.
- b. Claim 8 is indefinite for use of improper Markush language. The limitation that reads "selected from the group consisting of woody material, waste paper and MSW including and individual or combinations thereof" is confusing and renders the claim indefinite. The limitation should be changed to --selected from the group consisting of woody material, waste paper, [and] MSW and mixtures [including and individual or combinations] thereof--.
- c. Claim 9 is indefinite for use of improper Markush language. The limitation that reads "selected from the group consisting of aqueous bases and aqueous salts including and individual or combinations thereof" is confusing and renders the claim indefinite. The limitation should be changed to -- selected from the group consisting of aqueous

bases, [and] aqueous salts and mixtures [including and individual or combinations] thereof--.

d. In claim 10, the limitation that reads "wherein hydrogen containing water vapor, substantially devoid of carbon monoxide." renders the claim indefinite and unclear since it is not clear in which step the "hydrogen containing water vapor is formed" Note that a gaseous stream containing only these two components is not produced or formed in claim

1. The limitation that reads, "containing hydrogen separated from the absorbent" renders the claim indefinite and unclear, since it is not clear whether the hydrogen is separated from the gaseous stream containing water vapor or from an absorbent. Also, the dot after "monoxide" should be deleted.

e. Claim 12 is indefinite for use of improper Markush language. The limitation that reads "selected from the group consisting of silica gel and alumina including and individual or combinations thereof" is confusing and renders the claim indefinite. The limitation should be changed to -- selected from the group consisting of silica gel, [and] alumina and mixtures [including and individual or combinations] thereof--.

f. In claim 14 the limitation that reads "and is subjected to storage within a storage battery" is confusing, since it is not clear what is subjected to storage. The Examiner suggests amending the claim to read --The method of claim 13 wherein the fuel cell generates electricity and said electricity is [subjected to storage within] stored in a storage battery.--

g. Claim 17 is indefinite for use of improper Markush language. The limitation that reads "selected from the group consisting of hydrocarbons, methanol and acetic acid including and individual or combinations thereof" is confusing and renders the claim

indefinite. The limitation should be changed to -- selected from the group consisting of hydrocarbons, methanol, [and] acetic acid and mixtures [including and individual or combinations] thereof--.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 8-12 and 17-20 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent No. 4,553,981 (Fuderer).

Fuderer discloses a process for the recovery of hydrogen from a gaseous composition. The process comprises catalytic steam reforming organic vapors (hydrocarbons) to generate a hydrogen-containing gas. The hydrogen-containing gas is thereafter passed through a catalytic water-gas shift reactor to convert carbon monoxide in said hydrogen-containing gas stream into an effluent containing hydrogen and carbon dioxide. The effluent containing carbon dioxide and hydrogen is thereafter scrubbed with a carbon dioxide absorber liquid solution to remove the carbon dioxide and thereafter regenerating the carbon dioxide-containing absorber liquid in a separation tank and recycling the absorber liquid back to a scrubbing reactor (See col. 5, lines 1-20). (See col. 4, line 50 to col. 5, line 42). Fuderer disclose the use of aqueous alkaline solutions as the carbon dioxide absorbent (See col. 8, lines 19-25) and discloses the removal of impurities (instantly claimed water vapor) from the gas formed after the scrubbing step (After the removal of carbon dioxide) by passing the gas through an absorber such as a silica gel and alumina (See col. 8, lines 10-12).

No difference is seen between the instantly claimed invention and Fuderer's disclosure.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1,2, 5, 8-12, and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 4,436,532 (Yamaguchi et al) in view of US Patent No. 4,553,981 (Fuderer).

In regards to claims 1, 2, 5, 8, 17, 18, 19 and 20, Yamaguchi et al disclose a process wherein biomass such as municipal waste (See col. 9, lines 15-20 and lines 49-54) is first pyrolyzed to form a gaseous composition comprising organic vapors (i.e. methane). The organic vapors are thereafter steam reformed in the presence of a catalyst (See col. 8, lines 46-49, and col. 15, lines 60-65) forming a gaseous composition containing, hydrogen, water vapor and carbon monoxide; converting the carbon monoxide in the presence of steam (water vapor) and a iron catalyst (instantly claimed shift reaction) into carbon dioxide and hydrogen (See col. 9, lines 50-52, and col. 14, lines 25-36); and separating the carbon dioxide from the hydrogen (See col. 9, lines 60-62).

Yamaguchi et al disclose the removal of carbon dioxide from the gaseous composition after the shift reaction step, however fail to disclose how this removal is achieved.

Fuderer is relied upon to teach a process for the recovery of hydrogen from a gaseous composition comprising carbon dioxide and hydrogen. The gaseous composition is scrubbed with a carbon dioxide absorber liquid solution to remove the carbon dioxide and thereafter

Art Unit: 1754

regenerating the carbon dioxide-containing absorber liquid in a separation tank and recycling the absorber liquid back to a scrubbing reactor (See col. 5, lines 1-20).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the carbon dioxide removal process taught by Fuderer in Yamaguchi et al process, since Yamaguchi et al disclose the removal of carbon dioxide by any known process, and since Fuderer discloses the treatment of a gaseous compositions comprising organic vapors obtained from a steam reforming process and a shift reaction process as in Yamaguchi et al.

In regards to claim 9, Fuderer disclose the use of aqueous alkaline solutions (See col. 8, lines 19-25).

In regards to claims 10-12, Yamaguchi et al disclose the removal of steam from the gaseous composition (See col. 8, lines 65-68) however fail to disclose the step of removing water vapor form the hydrogen-containing gas formed with the use of and absorbent such as silica gel and alumina.

Fuderer is relied upon to teach the removal of impurities (instantly claimed water vapor) from the gas formed after the scrubbing step (After the removal of carbon dioxide) by passing the gas through an absorber such as a silica gel and alumina (See col. 8, lines 10-12).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used an absorber such as silica gel and alumina, to remove water vapor from the hydrogen rich and carbon-dioxide depleted gas of Yamaguchi et al, since Yamaguchi et al disclose the removal of steam from the gas and since Fuderer disclose the removal of impurities (i.e. water vapor or steam) from a similar process gas.

Art Unit: 1754

10. Claims 3, 4, 6, 7, and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi et al in view of Fuderer as applied to claims 1, 2, 5, 8-12 and 17-20 above, and further in view of US Patent No. 6,209,494, (Manikowski et al).

Yamaguchi et al in view of Fuderer apply herein as above.

The combination of references discloses the pyrolysis of biomass, the production of a carbonaceous residue and the production of hydrogen, however fail to disclose that the pyrolysis of the biomass is achieved by electrical heat (instant claim 3); that the pyrolysis is achieved within a vehicle (instant claim 4); reacting the carbonaceous residue with water to form carbon monoxide (instant claims 6 and 7); using the hydrogen to power a fuel cell (instant claim 13); that the fuel cell generates electricity which is stored in a battery (instant claim 14); that the fuel cell is located within a vehicle (instant claim 15) and carrying out the process step within a vehicle (instant claim 16).

Manikowski et al teaches the following: the integration of a pyrolysis reactor and a fuel cell in a vehicle, wherein a fuel is pyrolyzed to form a gaseous composition comprising hydrogen and a carbonaceous residue; using hydrogen containing gas to power a fuel cell; storing electricity generated in a fuel cell in a battery (See col. 1, lines 10-34; col. 2, lines 23-32; col. 6, line 55-col. 7, line 36; and col. 14, lines 1-5); using a thermal reactor (i.e. pyrolysis achieved with electrical heat); and treating a carbonaceous residue with water or steam to generate carbon monoxide (see col. 5, lines 30-49).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have applied the teachings of Manikowski et al in the process of the combined references (Yamaguchi et al in view of Fuderer) since it is well known in the art to use purified hydrogen to power fuel cells; since it is well known to use a thermal reactor to carry the

Art Unit: 1754

pyrolysis of fuels; and since it is well known to react carbonaceous residues from pyrolysis reactions with steam to produce carbon monoxide as taught by Manikowski et al.

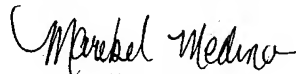
Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maribel Medina whose telephone number is (571) 272-1355.

The examiner can normally be reached on Monday through Friday from 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Maribel Medina
Examiner
Art Unit 1754